WHAT IS CLAIMED IS:

1. A control system for an internal combustion engine, the control system comprising:

a detector for detecting a rotational speed of an internal combustion engine;

a memory for storing a variation pattern of the rotational speed of the engine under the condition of excessive torque; and

a controller programmed to;

calculate a variation component of the rotational speed based on the rotational speed detected by the detector,

calculate a correlation between the variation component and the variation pattern that is read out from the memory, and

determine a torque variation state of the engine based on the calculated correlation.

2. The control system as claimed in claim 1, wherein said controller is further programmed to correct an ignition timing of the engine based on the determination result regarding the torque variation state.

3. The control system as claimed in claim 1, wherein said controller is further programmed to correct an intake air amount of the engine based on the determination result regarding the torque variation state.

4. The control system as claimed in claim 1, wherein the variation component is calculated based on difference between the rotational speed and an average of the rotational speeds.

5. The control system as claimed in claim 1, wherein the variation component is calculated based on difference between the rotational speed

and a normalized value for the rotational speed.

6. The control system as claimed in claim 5, wherein the normalized value is calculated by dividing the difference between the rotational speed and the average of the rotational speed by a square root of a product of a variance of the difference and a given period.

7. The control system as claimed claim 6, wherein the correlation is determined based on an inner product of the variation component of the rotational speed and the variation pattern, and wherein the controller is configured to determine that the torque variation of the engine is excessive when the correlation value exceeds a predetermined upper limit value and to determine that the torque variation of the engine is too small when the correlation is less than a predetermined lower limit value.

8. The control system as claimed in claim 7, wherein said controller is further programmed to retard an ignition timing of the engine when the torque variation of the engine is determined to be excessive, and to advance the ignition timing of the engine when the torque variation of the engine is determined to be too small.

9. The control system as claimed in claim 7, wherein the controller is further programmed to decrease an intake air amount of the internal combustion engine when the torque variation of the engine is determined to be excessive, and to increase the intake air amount of the engine when torque variation of the engine is determined to be too small.

10. The control system as claimed in claim 1, wherein the torque variation state is determined when an air-fuel ratio is intermittently switched between lean and rich.

11. The control system as claimed in claim 1, wherein the torque variation state is determined when a catalyst warming-up control is performed upon a catalyst disposed on the downstream side of the engine.

12. A control system for an internal combustion engine, the control system comprising:

means for detecting a rotational speed of an internal combustion engine;

means for storing a variation pattern of the rotational speed of the engine under the condition of excessive torque;

means for calculating a variation component of the rotational speed based on the rotational speed detected by the detector and calculating the correlation between the variation component and the variation pattern that is read out from the memory; and

means for determining a torque variation state of the engine based on the calculated correlation.

13. The control system as claimed in claim 12, further comprising means for correcting an ignition timing of the engine based on the determination result regarding the torque variation state.

14. The control system as claimed in claim 12, further comprising means for correcting an intake air amount of the engine based on the determination result regarding the torque variation state.

15. The control system as claimed in claim 12, wherein the variation component is calculated based on difference between the rotational speed and an average of the rotational speeds.

16. The control system as claimed in claim 12, wherein the variation component is calculated based on difference between the rotational speed and a normalized value for the rotational speed.

17. The control system as claimed in claim 16, wherein the normalized value is calculated by dividing the difference between the rotational speed and the average of the rotational speed by a square root of a product of a variance of the difference and a given period.

18. The control system as claimed claim 17, wherein the correlation is determined based on an inner product of the variation component of the rotational speed and the variation pattern, and wherein the controller is configured to determine that the torque variation of the engine is excessive when the correlation value exceeds a predetermined upper limit value and to determine that the torque variation of the engine is too small when the correlation is less than a predetermined lower limit value.

19. A method for determining torque variation of the internal combustion engine, comprising the steps of:

detecting a rotational speed of an internal combustion engine;

storing a variation pattern of the rotational speed of the engine under the condition of excessive torque;

calculating a variation component of the rotational speed based on the rotational speed detected by the detector and calculating the correlation between the variation component and the variation pattern that is read out from the memory; and

determining a torque variation state of the engine based on the calculated correlation.

20. The method as claimed in claim 19, further comprising the step of

correcting an ignition timing of the engine based on the determination result regarding the torque variation state.

21. The method as claimed in claim 20, further comprising the step of correcting an intake air amount of the engine based on the determination result regarding the torque variation state.

22. The method as claimed in claim 19, wherein the variation component is calculated based on difference between the rotational speed and an average of the rotational speeds.

23. The method as claimed in claim 19, wherein the variation component is calculated based on difference between the rotational speed and a normalized value for the rotational speed.

24. The method as claimed in claim 23, wherein the normalized value is calculated by dividing the difference between the rotational speed and the average of the rotational speed by a square root of a product of a variance of the difference and a given period.

25. The method as claimed claim 24, wherein the correlation is determined based on an inner product of the variation component of the rotational speed and the variation pattern, and wherein the controller is configured to determine that the torque variation of the engine is excessive when the correlation value exceeds a predetermined upper limit value and to determine that the torque variation of the engine is too small when the correlation is less than a predetermined lower limit value.

26. The method as claimed in claim 25, further comprising the steps of retarding an ignition timing of the engine when the torque variation of the

engine is determined to be excessive, and of advancing the ignition timing of the engine when the torque variation of the engine is determined to be too small.

27. The method as claimed in claim 26, further comprising the steps of decreasing an intake air amount of the internal combustion engine when the torque variation of the engine is determined to be excessive, and of increasing the intake air amount of the engine when torque variation of the engine is determined to be too small.

28. The method as claimed in claim 19, wherein the torque variation state is determined when an air-fuel ratio is intermittently switched between lean and rich.

29. The method as claimed in claim 19, wherein the torque variation state is determined when a catalyst warming-up control is performed upon a catalyst disposed on the downstream side of the engine.